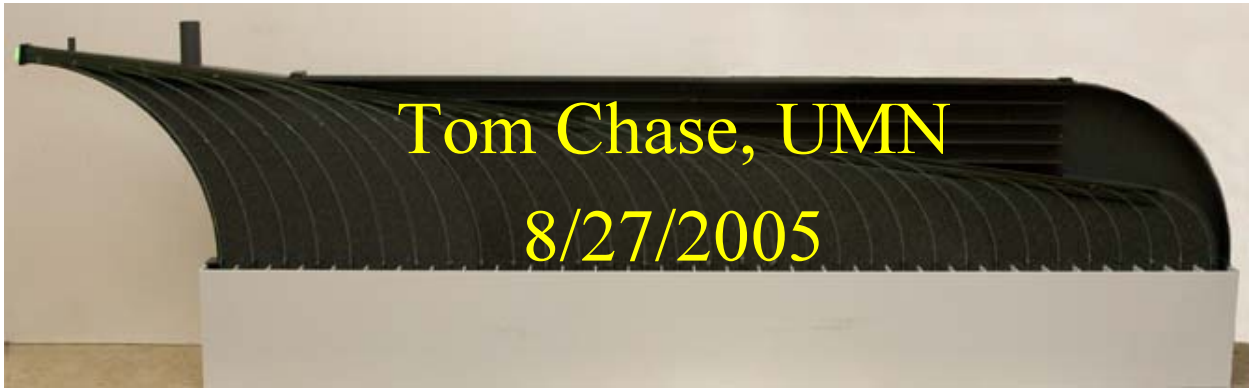
NOvA Module
End Caps & Manifolds



1. Threading: Time & Motion Studies
2. Attaching Manifolds to Scalloped Extrusions
3. Avoiding 2 Styles of Extrusions

Vacuum Puck

Pull fiber down a 16 m extrusion cell using a vacuum

- 10 sec: Attach fiber to puck
- 10 sec: Pull puck down extrusion
- 10 sec: Detach puck from fiber

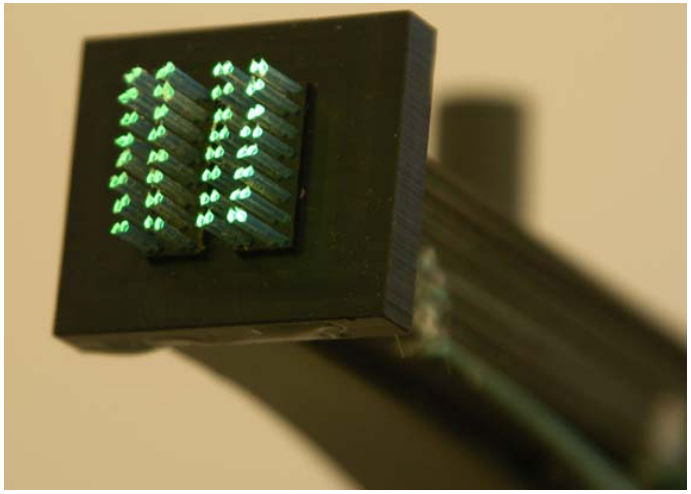
Fiber Threading Time & Motion

Changes on connector since May 2005:

- Dual holes changed to slots (design intent)
- Holes were beveled at the back

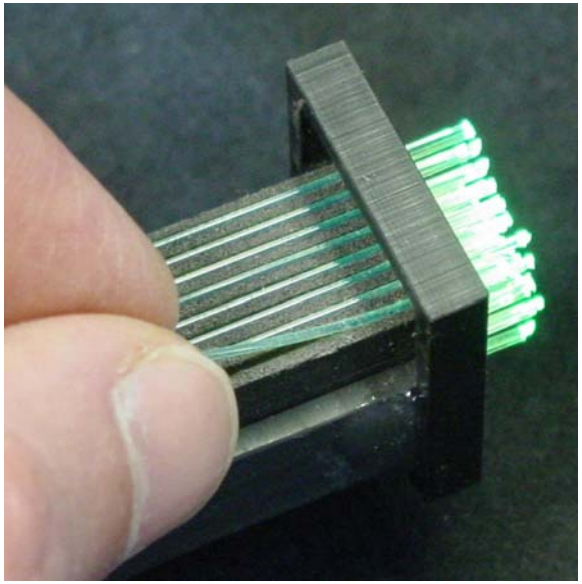
Threading Technicians:

- 1- Undergrad Student;
  1 Grad Student
- 1 hour training



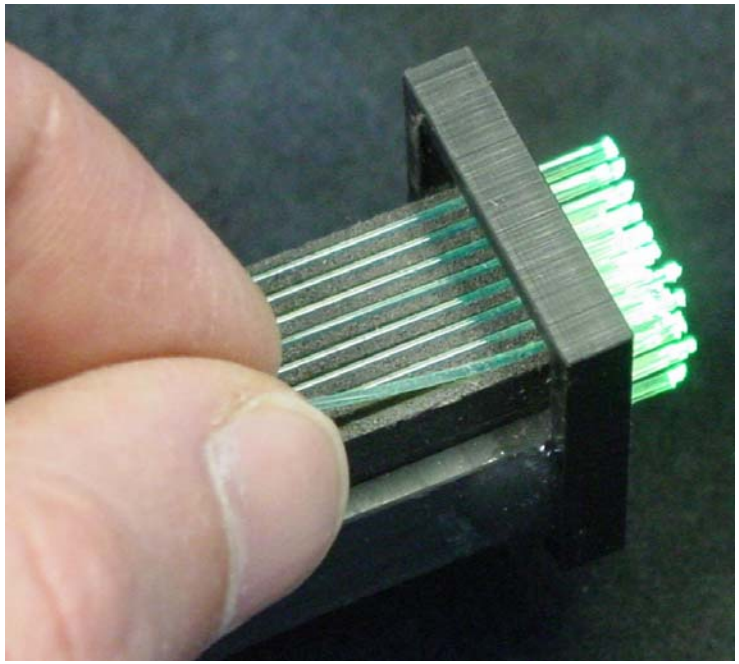
T&M: Lessons Learned

- Table height is ergonomically awful
- Bottom fiber raceway is installed too low
- Handedness is backwards



T&M: Results

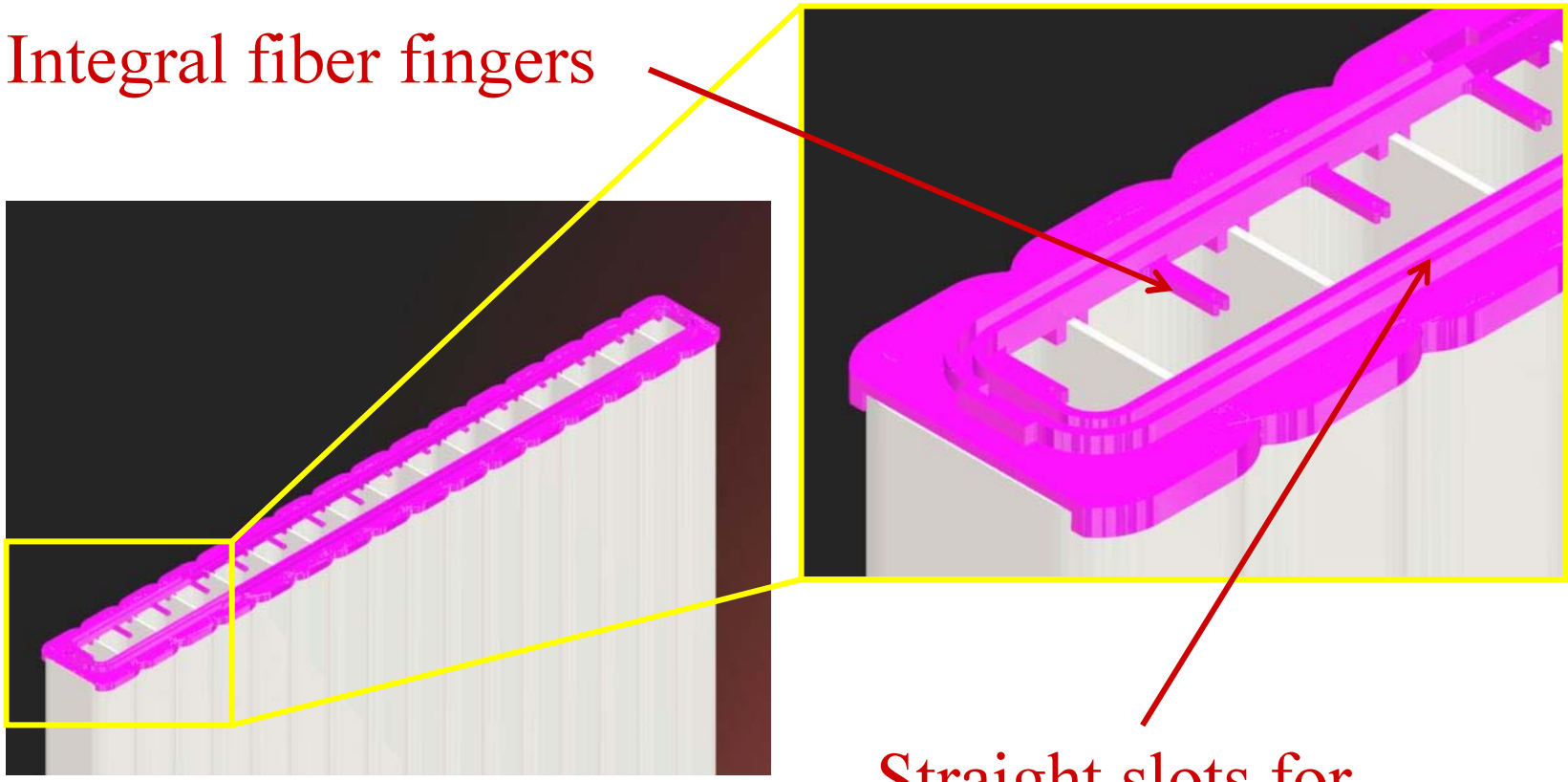
- Undergrad: 29 min
- Grad: 25 min



We met our 30 min goal;
expect substantial improvement!

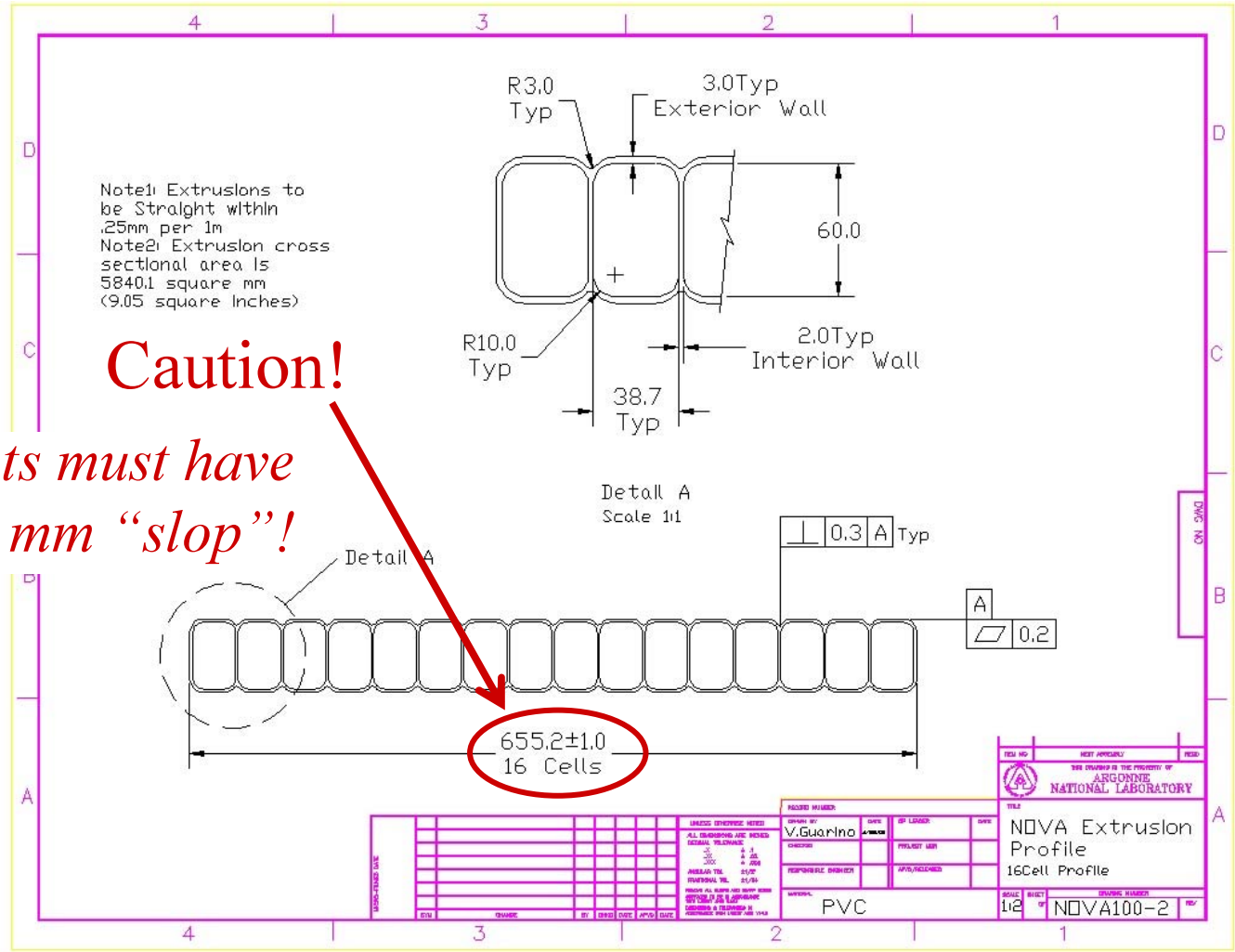
Manifold Scallop Adapter

Integral fiber fingers



Straight slots for extruded parts

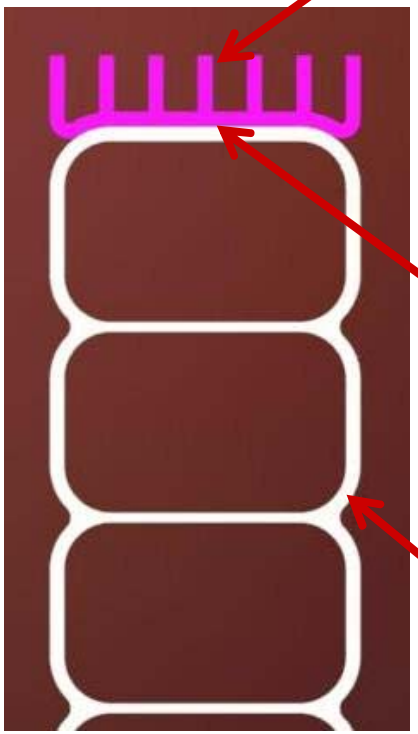
Sealing Scallops

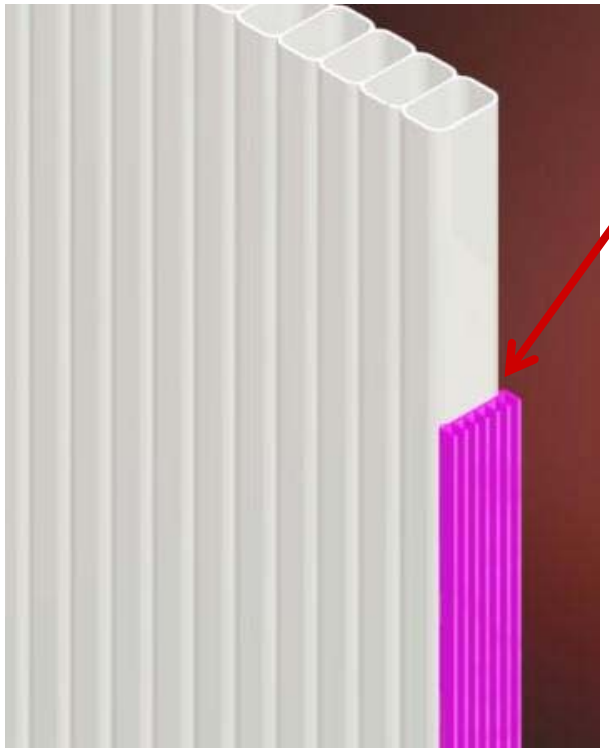


Caution!

Glue slots must have 2 mm "slop"!

Reinforcing
Vertical End Extrusions

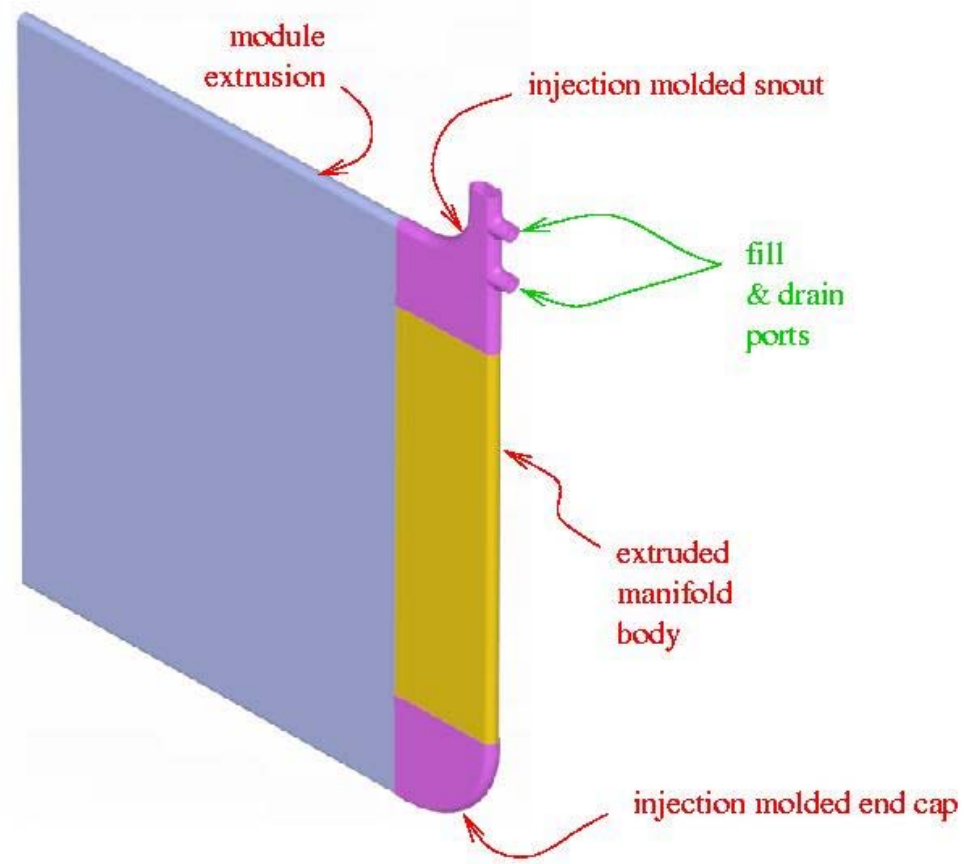




Summary

- Vacuum puck works well for stringing fibers
- 30 min threading time achieved; further improvement expected
- “Scallop adapter” enables using extruded manifold parts on scalloped extrusions (extrusion tolerances are an issue)
- We suggest using only one style of extrusion

Manifold Concept



Manifold Overflow Tank